AQUALUNG®

SERVICE MANUAL

FIRST STAGE
Calypso Yoke / DIN

Copyright ©2004 Aqualung France

REV. 01/04

Index

COPYRIGHT....3
INTRODUCTION....3
WARNINGS, ATTENTION, NOTE....3
MAINTENANCE....3
GENERAL INSTRUCTIONS....3
GENERAL CONVENTIONS....4
DISASSEMBLY PROCEDURE....4
REASSEMBLY PROCEDURE....6
FINAL CHECK BEFORE USE....9
Table 1. Troubleshooting guide....10
Table 2. List of tools....11
Table 3. Recommended cleaners and lubricants....12
Procedure A. Cleaning and lubricating....13
Table 4. Torque settings....14
Table 5. Checking specifications....14
Exploded view of Calypso First Stage....16

COPYRIGHT

This manual is the property of Aqualung France. Any copying, photocopying, reproduction, translation, electronic distribution (email, Internet...), even partial, and in whatever format, is expressly forbidden without the written consent of Aqualung France.

©2004 Aqua Lung France.

INTRODUCTION

This manual gives the instructions and the recommendations for the disassembly, the cleaning, the checking, the reassembly and the adjustment of an Aqualung regulator.
This manual is not an instruction manual for unqualified personnel. The procedures described in this manual are intended only for qualified personnel who have been trained in the servicing of Aqualung equipment during a specialised course.
If you do not understand certain procedures in this manual you should contact an Aqualung service consultant before undertaking any operation.

WARNINGS, ATTENTION, NOTES

Certain icons have been used to facilitate the reading and understanding of this manual. They have the following meanings :

WARNING: Indicates situations that could result in serious or fatal accidents if the advice given is not followed correctly.

ATTENTION: Indicates a situation or action that could cause serious damage to the product, making it dangerous if the advice given is not followed correctly.

NOTE : Notes are used to emphasize important points as well as information which needs to be remembered.

MAINTENANCE

Attention: Whatever the number of dives carried out during a year, the regulator should receive a complete service each year. If the regulator is used in a chlorinated or aggressive environment the service period should be reduced to six months.

In order to conform with the Aqualung Regulator Lifetime Guarantee, all servicing (inspection, servicing and repairs) should be recorded in the Service Record incorporated in the regulator User Manual.

GENERAL INSTRUCTIONS

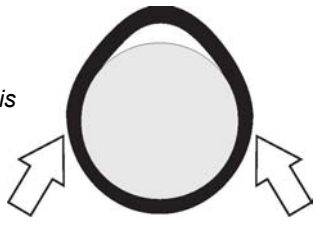
1. In order to carry out the procedures described in this manual correctly it is important that you follow the steps in the exact order indicated. Read the manual through completely so that you become familiar with all the procedures, the special tools and the replacement parts, before starting to disassemble the product. Keep this manual open near to you so that you can refer to it step by step. Do not rely on your memory..
2. All servicing and repair procedures should be carried out in a workshop that is clean, well lit, easy to access and specially fitted for the purpose.
3. The regulator body should never be directly held in the jaws of a vice. To hold the body, screw the tool 006230 into the HP port and then grip the tool with the vice.
4. Once the regulator has been disassembled, the re-usable components should be separated from the components that need to be replaced. Fragile items with seats or crowns with critical sealing surfaces should be separated and protected during servicing in order to prevent any damage.
5. Use only spare parts from Aqualung service kits. Never replace an Aqualung part with one from another manufacturer, even if it appears similar.
6. Never re-use regulator parts which should be replaced on the pretext that the regulator has seen little use since its manufacture or since its last service.
7. When reassembling, check that the torque used conforms with that shown in Table 4, Torque. Some parts can be irretrievably damaged if the acceptable torque is exceeded.

GENERAL CONVENTIONS

The conventions described below define the actions to be carried out when an instruction is given.

1. **Unscrew**: to unscrew a threaded part, turn it anti-clockwise.
2. **Screw**: to screw a threaded part, turn it clockwise.
3. **Remove the O-ring**: To remove an O-ring follow the method below, using the special tool provided for this purpose. Any tool that could damage the O-ring should be avoided. In every case, replace the O-ring removed with a new one.

Press simultaneously on the two sides of the O-ring in order to form an 'eye'. . Insert the special tool into this eye to remove the O-ring.



4. The acronyms used:
   LP: Low Pressure
   MP: Medium Pressure
   HP: High Pressure

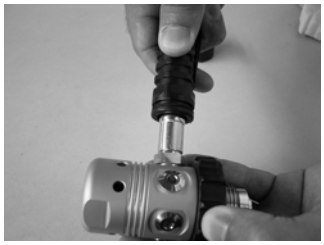
5. Numbers in brackets indicate the part number of the component shown on the exploded view attached.

DISASSEMBLY PROCEDURE

***Note**: Before commencing disassembly, consult the exploded view to check the reference numbers of all parts requiring replacement. These parts should all be replaced by new parts and should not be re-used on the pretext that the regulator has seen little use since its manufacture or since its last service.*

***Attention**: Use only the special tool when removing O-rings in order to avoid damaging the seal recess. The slightest scratch on a sealing surface could cause a leak. If a surface should be damaged then this part should be replaced with a new one. Do not use any pointed instrument or metal tool to remove O-rings.*

DISASSEMBLY



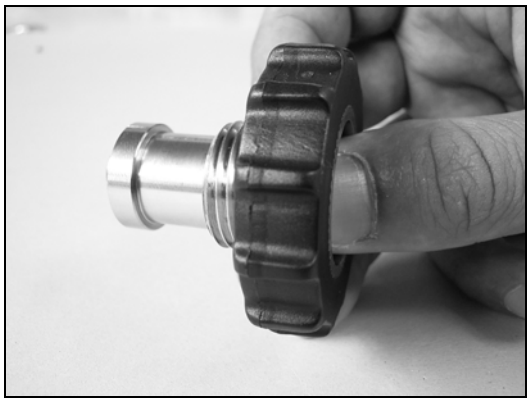
1.Remove the hose protector from the hose and unscrew the hose using a 9/16 spanner.

2. Remove the HP and MP plugs using a 4mm Allen key. Remove the O-rings from the plugs.

3. Screw the holding tool (ref: 116230) into the HP port on the body and clamp it in a vice.

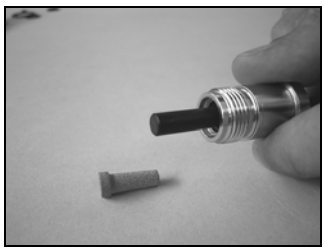
4. Disassembly of the DIN version

4.1 Unscrew the DIN seat using a 6mm Allen key.



4.2. Remove the handwheel from the seat by pushing on the seat.

4.3. Remove the O-rings (14) et (16) from the DIN seat.



4.4. Using the tool (ref: 116236), extract the conical filter from the seat, then remove the O-ring (9) from its groove.

5. Disassembly of the yoke version

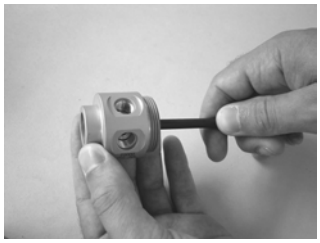
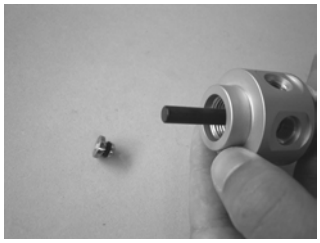
5.1 Unscrew the yoke seat using a large adjustable spanner, remove the yoke and the washer (12).

5.2 Remove the yoke seat O-ring.

5.3 Using the tool (ref: 116236), extract the conical filter from the seat, and then remove the O-ring (9) from its groove.

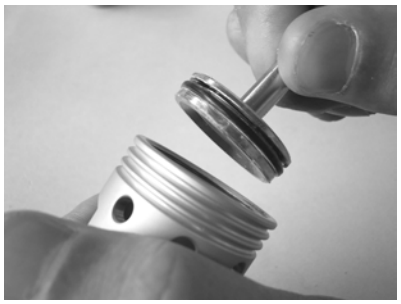
6. Clamp the regulator in a vice with the sticker uppermost. Unscrew the plug (2) using an adjustable spanner.).Remove the spring and the plug (2)/piston (4) assembly. Remove the regulator from the vice.

7.Unscrew the holding tool from the body.

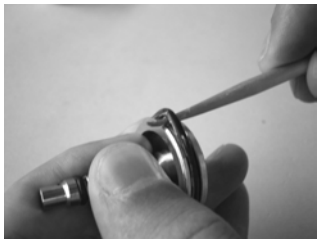
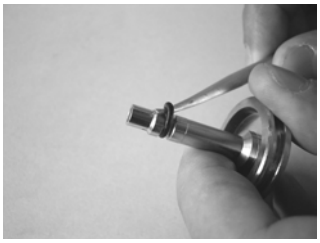



8. Use the tool (ref: 116236) to extract the HP seat.

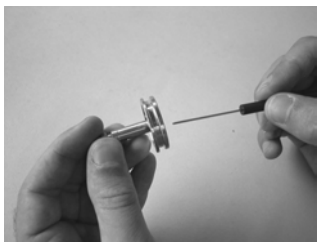
9.Extract the O-ring from the HP seal groove.



10. Extract the piston from the rear plug.

11. Remove the two O-rings from the piston.

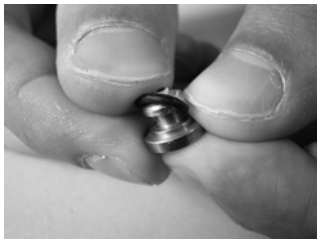


12. Use the tool (ref: 116236) to extract the HP seat from the piston.

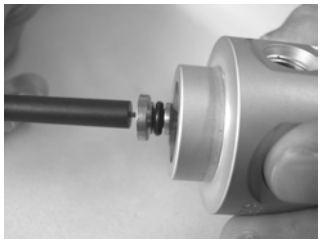
END OF DISASSEMBLY

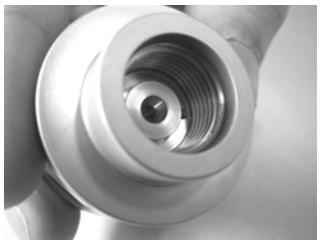
Before starting to re-assemble the regulator, make sure that all replacement parts have been cleaned and lubricated in accordance with *Procedure A : Cleaning and Lubricating* on page 13.

RE-ASSEMBLY PROCEDURE

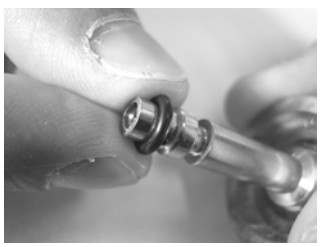


1.Fit an O-ring (5) into the groove on the HP seat.

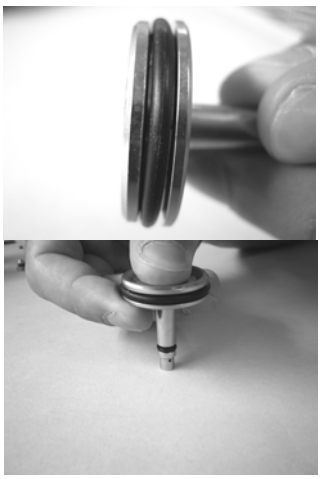




2. Use the tool 116236 to insert the HP seat into the body.

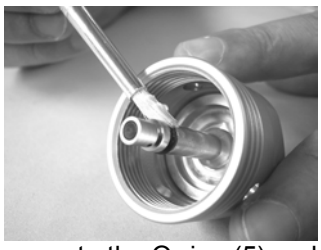


3. Fit the O-rings (5) and (3) onto the piston (4)



4. Place the HP seat (6) on the table, then insert it into the piston.

5. Apply some Christolube grease to the O-ring and to the edges of the piston, then insert the piston fully into the plug (2).

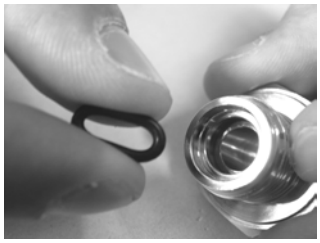


6. Apply some Christolube grease to the O-ring (5) and to the shaft above and below the O-ring groove.

Do not allow any grease on to the seat .

7. Position the piston spring. Use a small brush to lubricate the body threads, then screw the plug/piston/spring assembly onto the body.

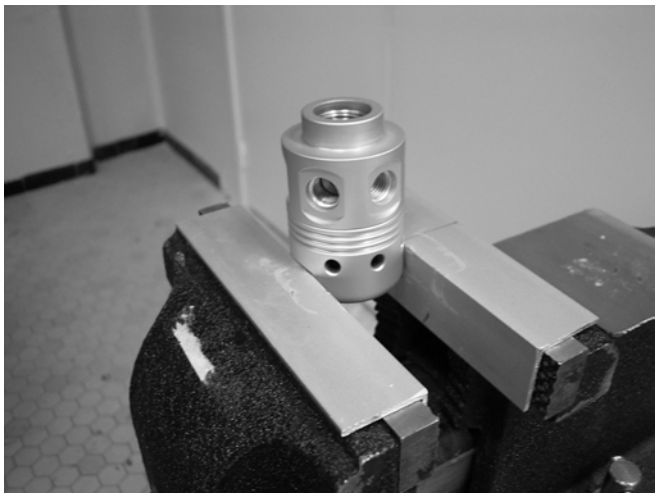
8. Yoke version



8.1 Fit the O-ring (9) into the groove on the yoke seat.

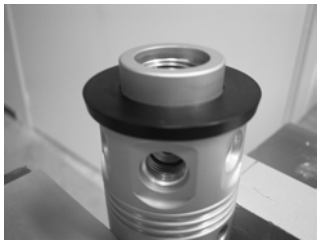
8.2 Fit the O-ring (14) onto the yoke seat.

8.3 Insert the filter into the yoke seat..

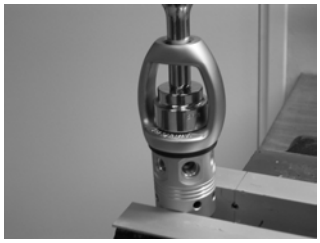


8.4 Clamp the body/plug assembly in a vice using the two flats on the plug (2).

Use a vice with soft jaws in order to avoid marking the plug.



8.5 Fit the yoke washer (12) with its larger diameter uppermost, position the yoke and then screw the yoke sea (15) into the body.

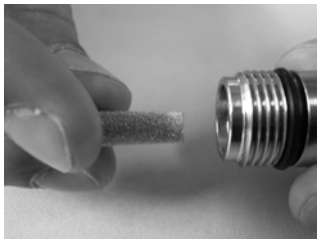


8.6 Tighten the yoke seat using a torque wrench at 2.5 M.Kg . Place the yoke screw through the retaining hole on the dust cap (17) and screw the assembly into the yoke.

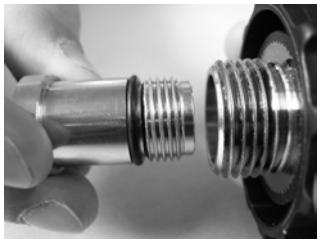
9. DIN version

9.1 Fit the O-ring (9) into the DIN seat (15).

9.2 Fit the O-rings (14) and (16) into the DIN seat (15).



9.3 Fit the conical filter into the DIN seat (15).

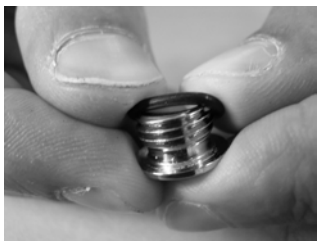


9.4 Fit the handwheel (12) onto the DIN seat (15)

9.5 Clamp the body/plug assembly in a vice using the two flats on the plug (2).

Use a vice with soft jaws in order to avoid marking the plug.

9.6 Screw the seat/handwheel assembly onto the body, then tighten with a torque wrench at 2.5 m.kg



10. Fit an O-ring (9) on the plug (10) and an O-ring (19) on the plug (18).

11. Screw the hose assembly into the 3/8 MP port situated next to the serial number. Tighten it with a 9/16 spanner. Refit the hose protector.

END OF REASSEMBLY

Final check before use

Checking the medium pressure :

1. Screw an MP gauge (0-25 bar) into one of the MP ports. If the gauge is not fitted with an over-pressure valve, then it is vital that the second stage is fitted so that it can act as an over-pressure valve in the event of an HP leak.
2. Connect the first stage to a cylinder charged to 200bar. Slowly open the cylinder valve to put the regulator under pressure.

Attention: if the MP indicated rapidly exceeds 9.5bar then this indicates a HP leak. Close the cylinder valve immediately and purge the regulator.
Refer to **Table 1**. **Troubleshooting Guide.**

3. With the regulator under pressure, press 2 or 3 times on the purge button to produce an airflow.
4. Check the MP reading, which should be between 9 and 10 bar.
5. Leave the regulator under pressure for about 10 seconds – the MP should remain stable and should not rise by more than 0.3 bar. If the MP rises more than 0.3 bar this indicates that there is a leak. Refer to **Table 1**. **Troubleshooting Guide.**
6. Immerse the first stage completely in water to check that there are no leaks.

***Note**: Do not mistake any bubbles that are trapped in the regulator with a leak. If there is a leak there will be a constant stream of bubbles.*

When you are sure that there is no leak, close the cylinder valve and purge the regulator. Remove the first stage from the cylinder and refit the dust cap.

If a leak has been detected then note its source and refer to **Table 1. Troubleshooting Guide.**

Table 1. Troubleshooting Guide

SYMPTOM	POSSIBLE CAUSE	TREATMENT
Increase in MP (likely to cause a second stage leak)	1. The HP seat (6) is worn or damaged.	1. Replace the HP seat.
	2. The seat (11) is damaged.	2. Replace the seat.
	3. The O-ring (3) is worn or damaged.	3. Replace the O-ring
	4. The O-rings (5) are worn or damaged.	4. Replace the O-ring
	5. The piston (4) is damaged	5. Replace the piston
MP too low	1. HP too low	1. Check supply pressure
	2. Spring deformed/damaged	2. Change the spring
External leak	2. The O-ring (5) is worn or damaged.	2. Replace the O-ring
	3. The O-ring (3) is worn or damaged.	3. Replace the O-ring
	4. The O-ring (14) is worn or damaged.	4. Replace the O-ring
	5. . The groove housing O-ring (5)on the body is damaged	5 Replace the body
	6. The groove for O-ring (2) on the plug is damaged	6. Replace the plug
Reduced airflow or significant breathing resistance on complete regulator.	1. Cylinder valve not completely open	1. Open the valve, check the cylinder pressure
	2. Cylinder valve requires servicing	2. Try another cylinder
	3. Filter (13) blocked	3. Replace the filter
	4. Foreign body in the gas circuit	4. Check gas circuit

Table 2. List of Tools

REF	DESCRIPTION	APPLICATION	US PART NO.
116222	MP pressure gauge complete 0/16B	Checking medium pressure	111610
116236		Seat assembly/disassembly	109436
116230		Holding tool	100395
N/C	Socket wrench	Socket wrench tightening seat (29)	111001
N/C	Torque wrench 2.5 m.kg	Yoke Seat, DIN Seat	n/a
N/C	Extender	Extender for socket wrench	n/a
N/C	Large Adjustable spanner	Yoke seat removal	n/a
N/C	Allen key 4mm	MP and HP plugs	n/a
N/C	Allen key 6mm	DIN seat removal	n/a
N/C	Hexagonal tool 6mm	Tightening DIN seat (fits to torque wrench)	n/a
N/C	O-ring tool	Fitting and removing O-rings	944022

Table 3. Recommended cleaners and lubricants

LUBRICANT / CLEANER	APPLICATION	SOURCE
Christolube MCG 111	All O-rings	Aqualung, ref. 480025
	Attention: *Silicone parts do not require lubrication. Do not grease them. Greasing silicone parts can change their molecular construction and cause premature degradation of the material.*	
Oakite #31	Acid bath for cleaning brass and stainless steel parts.	Oakite Products, Inc.
NETALU	Acid bath for cleaning brass and stainless steel parts.	Aqualung, ref. 455001
Diluted white vinegar	Acid bath for cleaning brass and stainless steel parts.	Household stores
	Attention: *Do not use hydrochloric acid for cleaning parts. Hydrochloric acid, even when well diluted, attacks the coating of metal parts and leaves a corrosive deposit that damages plastic parts and O-rings.*	
Washing-up liquid (diluted with hot water)	Degreases brass and stainless steel parts; general cleaning of plastic and rubber parts.	Household stores

Procedure A
Cleaning and Lubricating
(All Aqualung Regulators)

Cleaning brass and stainless steel parts.

1. Pre-clean by soaking in NETALU diluted to 25%.
2. Cleaning in an ultra-sonic bath filled with a mixture of washing-up liquid + hot water. If some resistant deposits remain then fill the ultrasonic bath with white vinegar and repeat. DO NOT put plastic, rubber, silicone or anodised aluminium parts in contact with vinegar.
3. Rinse in demineralised or fresh water to avoid calcium deposits. Soak for 10 minutes. Dry with filtered low pressure air and then check that their condition is now suitable for re-use.

Cleaning plastic, rubber and anodised aluminium parts.

For anodised aluminium parts : soak in a « NETALU diluted to 25% ». Rinse in fresh water and dry with low-pressure filtered air.
For plastic parts. (casings, plugs..) : clean in an ultrasonic bath containing a mixture of washing-up liquid and hot water. Use only a toothbrush with nylon bristles to remove any deposits. Rinse in fresh water and dry with low pressure filtered air

***Attention**: D not place plastic and rubber parts in contact with acid solutions. This could alter their physical properties and cause degradation and premature breakdown.*

Cleaning parts for Nitrox/O2 use.

1. Metal parts : Pre-clean by soaking in NETALU diluted to 25%.
2. Ultrasonic cleaning in Promoclean TP108 diluted at 5% .
3. Rinse in demineralised water. Soak for 10 min.
4. Dry in the open air in a clean and dust-free atmosphere. Place the parts on a white cloth, allow to dry and check after drying that the cloth shows no grease deposits and that the condition of the parts is appropriate for re-use with Nitrox/O2.

Cleaning hoses.

If there is significant corrosion then it is permissible to soak only the ends in an ultrasonic bath, avoiding any possibility of the solution entering the hose. Rinse in fresh water and allow to dry with the connections hanging down. Dry the inside with filtered compressed air before reconnecting the hose to the regulator.

Wiping.

To wipe parts, use a white filter paper, a pure cotton cloth or any other material that **does not produce fluff.**

Inspection.

Visually check under a white light (day light or artificial light).
The parts are completely free of any traces of :

1. organic materials (oil, grease, paint, rust…)
2. cleaning agents
3. dust
4. humidity

Lubrication.

When handling O-rings wear unpowdered latex gloves. It is important not to allow contact between the internal components and the skin or any other source of contamination when the regulator is being prepared for Nitrox use. All seals should be lubricated with Christolube MCG111. Cover the seals with a light film of grease and remove any excess by rolling the seal between finger and thumb. Do not use an excess of grease, this can have the effect of accumulating particles which could damage the O-rings.

Tableau 4. Couples de serrages

N° REFERENCE	DESCRIPTION	COUPLE
125712	Rear plug (2)	2.5 m.kg.
125720	DIN seat (15)	2.5 m.kg.
125716	Yoke seat (15)	2.5 m.kg.

Table 5. Checking specifications

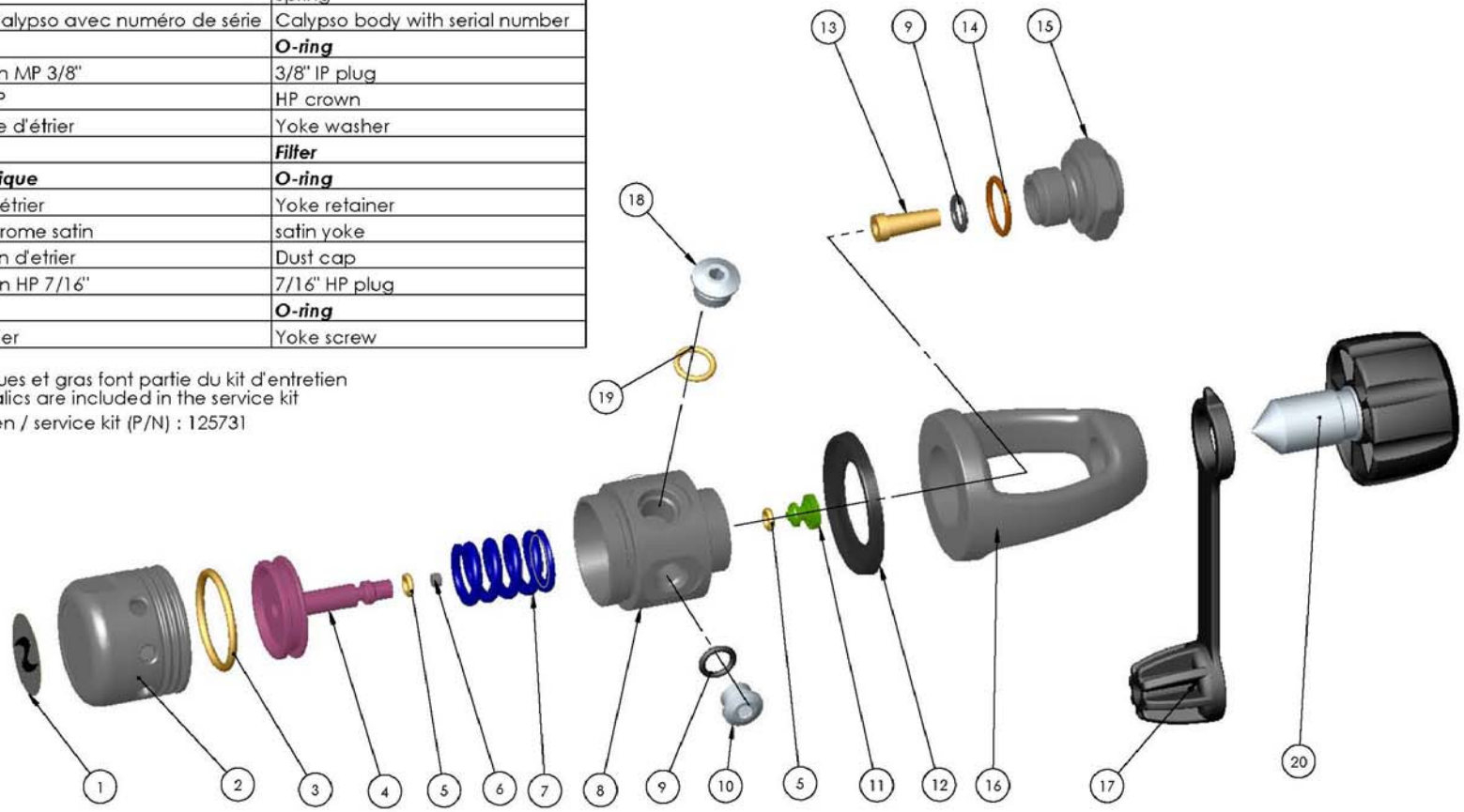
TEST	INSTRUCTIONS	SPECIFICATIONS
Leak Test	180 bar < Working pressure < 230 bar	No leak
Medium Pressure	180 bar < Working pressure < 200 bar	**MP at 9.5 bar ± 0.5 bar**
MP Variation	160 bar < Working pressure < 200 bar	After purging the regulator several times, the MP should not increase by more than 0.3 bar in 5-15 seconds.

Maintenance Notes.

Ce plan est la propriété d'Aqualung. Il ne doit être ni copié ni diffusé sans autorisation écrite d'Aqualung.
This drawing is confidential. It shall not be copied or disclosed without the written consent of Aqualung.

No	QTE	REF.	DESIGNATION	DESCRIPTION
1	1	125713	Sticker logo Aqualung	Aqualung logo sticker
2	1	125712	bouchon calypso	Calypso end cap
3	1	***124708***	***Joint torique***	O-ring
4	1	125717	Piston	Piston
5	2	***124707***	***Joint torique***	***O-ring***
6	1	***116126***	***Clapet HP***	***HP seat***
7	1	116171	Ressort	Spring
8	1	125718	Corps Calypso avec numéro de série	Calypso body with serial number
9	4	***124703***	***Bague***	***O-ring***
10	3	122233	Bouchon MP 3/8"	3/8" IP plug
11	1	116167	Siège HP	HP crown
12	1	125710	Rondelle d'étrier	Yoke washer
13	1	***129151***	***Filtre***	***Filter***
14	1	***124706***	***Joint torique***	***O-ring***
15	1	125716	Siège d'étrier	Yoke retainer
16	1	124610	Etrier chrome satin	satin yoke
17	1	124555	Bouchon d'etrier	Dust cap
18	1	122237	bouchon HP 7/16"	7/16" HP plug
19	1	***124701***	***Bague***	***O-ring***
20	1	124148	Vis d'etrier	Yoke screw

Les références en italiques et gras font partie du kit d'entretien
Part numbers in bold italics are included in the service kit
Reférence kit d'entretien / service kit (P/N) : 125731



			Désignation	HP Calypso
			Description	Calypso first stage
			Notice	------
			Date	03/07/2003
N°	Date Modif	Ind		

Vu par: Vérif:

1ère Avenue, 14ème rue - BP 148
06513 CARROS CEDEX FRANCE
Tel: (33) 04 92 08 28 88
Fax: (33) 04 92 08 28 99

AQUA LUNG

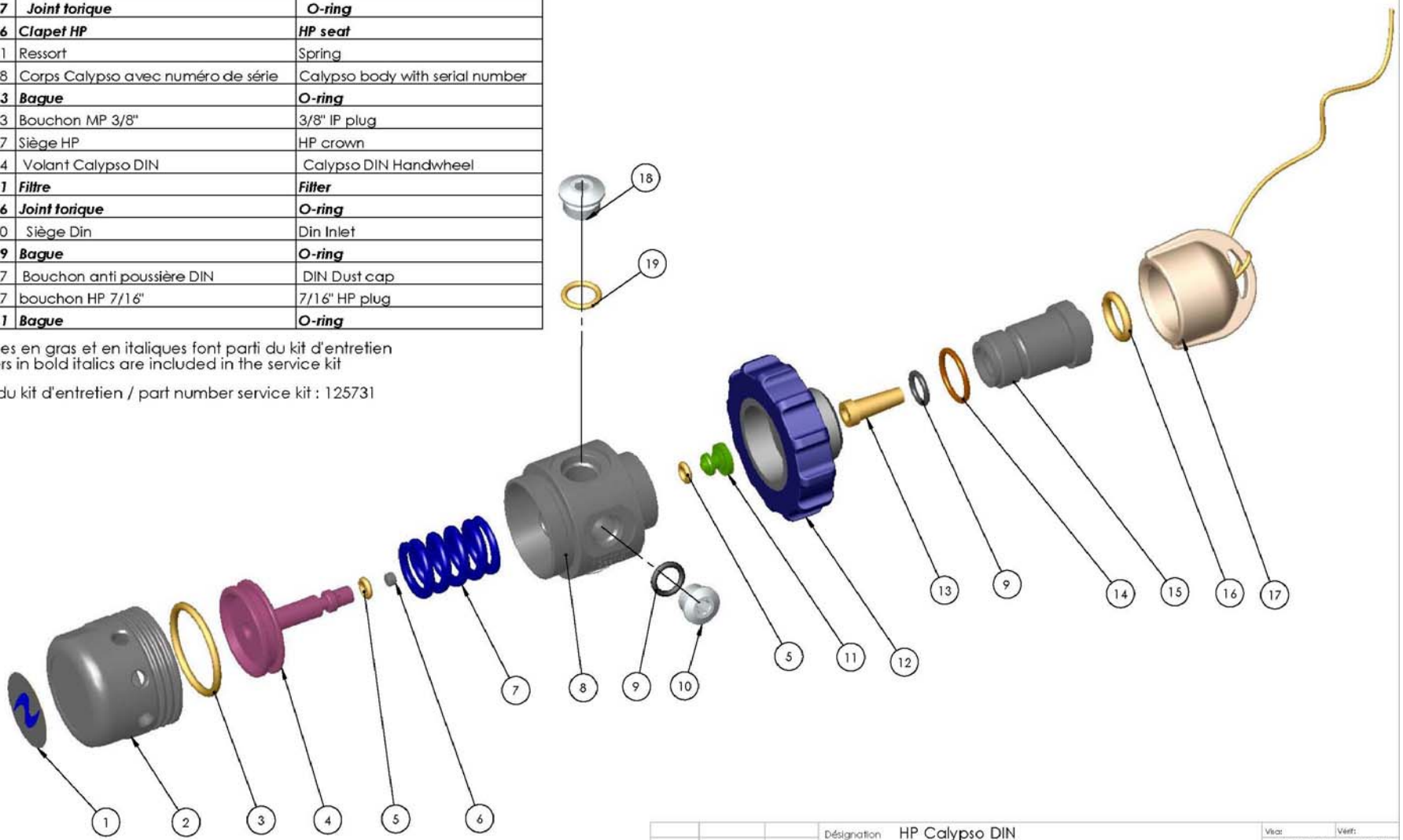
125730

No	QTE	No. PIÈCE	DESIGNATION	DESCRIPTION
1	1	125713	Sticker logo Aqualung	Aqualung logo sticker
2	1	125712	bouchon calypso	Calypso end cap
3	***1***	***124708***	***Joint torique***	***O-ring***
4	1	125717	Piston	Piston
5	***2***	***124707***	***Joint torique***	***O-ring***
6	***1***	***116126***	***Clapet HP***	***HP seat***
7	1	116171	Ressort	Spring
8	1	125718	Corps Calypso avec numéro de série	Calypso body with serial number
9	***4***	***124703***	***Bague***	***O-ring***
10	3	122233	Bouchon MP 3/8"	3/8" IP plug
11	1	116167	Siège HP	HP crown
12	1	125714	Volant Calypso DIN	Calypso DIN Handwheel
13	***1***	***129151***	***Filtre***	***Filter***
14	***1***	***124706***	***Joint torique***	***O-ring***
15	1	125720	Siège Din	Din Inlet
16	***1***	***124709***	***Bague***	***O-ring***
17	1	124557	Bouchon anti poussière DIN	DIN Dust cap
18	1	122237	bouchon HP 7/16"	7/16" HP plug
19	***1***	***124701***	***Bague***	***O-ring***

les références en gras et en italiques font parti du kit d'entretien
Part numbers in bold italics are included in the service kit

référence du kit d'entretien / part number service kit : 125731

Ce plan est la propriété d'Aqualung. Il ne doit être ni copié ni diffusé sans autorisation écrite d'Aqualung.
This drawing is confidential. It shall not be copied or disclosed without the written consent of Aqualung.



			Désignation	HP Calypso DIN
			Description	Din Calypso first stage
			Notice	- - - - - -
			Date	03/07/2003
N°	Date Modif	Ind		

Vis a: Vérif:

1ère Avenue, 14ème rue - BP 148
06513 CARROS CEDEX FRANCE
Tel: (33) 04 92 08 28 88
Fax: (33) 04 92 08 28 99

AQUA LUNG

125735

1ere Avenue – 14e rue – BP 148
06513 CARROS cedex – France
☎ 00 33.(0)4 92 08 28 88
FAX 00 33.(0)4 92 08 28 99